

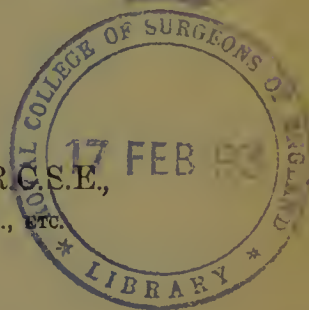


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THE  
SURGICAL TREATMENT  
OF  
TRACHOMA.

A PAPER READ IN THE SECTION OF OPHTHALMOLOGY, AT  
THE ANNUAL MEETING OF THE BRITISH MEDICAL  
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## THE SURGICAL TREATMENT OF TRACHOMA,

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A GLANCE at the literature of trachoma shows that the surgical treatment of the disease has been practised from a very remote period. Hippocrates, the Father of Medicine, recommended excision of the "granulations" followed by the actual cautery; and removal of the morbid material by energetic friction (*blepharoxysis*) was a routine method of treatment among the ancient Greeks. Celsus described a treatment in which the thickened eyelids were scraped with a fig leaf or with a roughened surgical instrument; while Paulus Ægineta used the bone of a cuttle fish, or pumice stone, to effect the same purpose. These instances from writers of antiquity (and others might easily be cited) are enough to show that mechanical means have been employed in trachoma from time immemorial.

Passing now to the commencement of the eighteenth century, we find concise directions for the treatment of trachoma given in a curious and interesting book by Sir William Reed (1). That author says if the excrescences be "thick and gross" they "must be cut away dextrously with the point of a lancet." Woolhouse, oculist to James II and to William III, who lived between the years 1650 and 1730, adopted the extreme method of scarifying the conjunctiva with barley ears.

The same surgeon also invented an instrument, the *xystrum*, which he used for a similar purpose (2). Benedict Duddell, who published an account of his experiences in the year 1729, enthusiastically recommended scarification of the conjunctiva in almost all inflammatory conditions of the eye, including trachoma. Following the example already set by Woolhouse, Duddell carried out that operation by the aid of a brush made of barley beards. In short, it would seem that the use of fern-bulbs, pumice stone, and other agents of a like character, was sufficiently common in trachoma during the last century.

At the commencement of the present century, the attention of surgeons generally was drawn to the existence of the disease. The British troops had then lately returned from their Egyptian campaigns, many of them blinded by ophthalmia, while many came back with the disease in a still active condition. It is not astonishing that under these circumstances outbreaks of ophthalmia soon made their appearance in various parts of England. So serious did the trouble become that it was found necessary in 1807 to erect three hospital stations for the exclusive reception of soldiers afflicted with ophthalmia. A year later these establishments contained, according to the account given by Dr. Vetch, no less than 900 cases, consisting of detachments derived from more than forty different army corps. It hardly admits of doubt that under the generic name of "Egyptian ophthalmia" all kinds of epidemic eye disease now known to us were included. At the same time, one cannot fail to recognise the fact that trachoma played a most important part in the different outbreaks of the scourge.

Copious blood-letting, even to syncope, was then the remedy *par excellence*, though we find ample proof that the surgical treatment of the conjunctiva itself was by no means entirely neglected. To quote a single instance, (3) that enlightened observer John Cunningham Saunders, who died in the year 1810, treated inveterate forms of trachoma by excision of the granular conjunctiva. It is both interesting and instructive to observe that Saunders recognised the relation of

certain opacities of the cornea to diseased conditions of the lids.

Dr. Charles Farrell, (4) writing in the year 1811, says that he has occasionally met with cases of ophthalmia in which the inflammation was kept up by "small, hard, and rough tumours in the conjunctiva lining the eyelids," and he recommends removal of the growths by dissection.

In the year 1812 Sir William Adams, an oculist in civil practice, volunteered to treat by "a new method" the cases of Egyptian ophthalmia among the inmates of the Royal Hospital for Seamen, at Greenwich. This offer excited a vivid interest, both in medical and in military circles. A house was taken in London, to which the pensioners were sent, and Adams's methods of treatment were put into force.

The official papers, (5) drawn up by the medical officers of Greenwich Hospital, and published by authority in 1814, claimed an absolute success for the new method. That report ran as follows:—"We think it our duty to state, for the information of the Board, that Mr. Adams has discovered a mode of curing the Egyptian ophthalmia, which has been successfully practised on several of the pensioners, some of whom had been blind for three or four years, and given up as incurable by the most eminent oculists then in London, . . . that the promulgation by Mr. Adams of this important discovery be considered as a great national desideratum. By the adoption of his practice we are of opinion, from what we have seen of its effects, that a very large proportion of the seamen and soldiers who have been discharged the service blind of the ophthalmia might be again rendered fit for duty, or be made useful members of society."

An embittered controversy, however, speedily arose as to the value of the treatment; and a perusal of the evidence (6) makes it plain that the so-called "new methods" of Sir William Adams were merely those of his tutor, Mr. Saunders, adopted without the slightest acknowledgment. The only claim to originality which can be conceded to Sir William Adams is that he



employed a knife where Mr. Saunders used a pair of scissors.

"I have seen," said Dr. Vetch in 1820, (7) "many cases in which it (*i.e.*, the granulated surface) has been removed with more zeal than discretion, twenty or thirty times successively." It is evident, therefore, that surgical means were employed at the time Vetch wrote in a vigorous and energetic way.

So far the practice of British surgeons has alone been considered, but a cursory glance at foreign literature will show that the use of operative measures in trachoma was by no means confined to these islands. About this period we find, for instance, many continental surgeons recommending and practising scarification of the lids and partial excision of diseased conjunctiva. The German oculist, V. Walther, stands out prominently as an advocate of such measures. His plan was to remove a large piece of the conjunctiva, and he claimed great benefit from such treatment, not only in chronic, but also in acute, forms of the disease. Rust, Eble, and Gouzée recommended the employment of surgical measures in trachoma, though not necessarily to the exclusion of other means of treatment. To be brief, it may be taken as granted that at this period operative methods enjoyed considerable vogue both at home and abroad.

Before long, however, the escharotic treatment of trachoma sprang into prominence. McGregor, Surgeon to the Royal Military Asylum, had recommended the use of these agents in the year 1812, and he laid especial stress upon the advantages possessed by lunar caustic in the treatment of granular lids. Vetch, after a trial of surgical methods, declared his preference for the use of copper sulphate, silver nitrate, lead acetate, verdigris, burnt alum, and potash, for the employment of which remedies he laid down a series of excellent rules. O'Halloran, an army surgeon of great experience, used blue-stone and lunar caustic in 1824. ["Practical Remarks on Acute and Chronic Ophthalmia, and on Remittent Fever, London, 1824."] "It is astonishing," wrote O'Halloran, "how quickly the state of the eyelid, denominated granular, is removed

by the blue-stone, if the subject be not of scrofulous habit, or the eyelids spongy, watery, or covered with fatty dry lumps. In the latter case, the knife will be necessary for the removal of the tumours ; after which a solution of blue-stone will complete the cure. The case in question is the only one in which, in my opinion, the knife is admissible to the internal surface of the eyelids."

Fifteen years later, Gouzée, a Belgian surgeon, warmly advocated the employment of silver in trachoma. He used a concentrated solution of the caustic, the potent effects of which were lessened by the subsequent application of oil to the conjunctiva. Hairion, after an extensive experience of the disease, also recommended the use of silver nitrate in strong solution. Guthrie (the founder of the Royal Westminster Ophthalmic Hospital), treated trachoma by means of an ointment which contained about eighty grains of the silver salt to an ounce of hog's lard. This preparation, commonly known as Guthrie's black ointment, was applied directly to the conjunctiva by means of a brush. (8)

The classical writings of Albrecht v. Graefe, published in 1854, placed the escharotic treatment of conjunctival affections on an assured footing, and for many years surgical methods fell into comparative disuse. If we may judge from a statement made in Lawrence's *Treatise on the Diseases of the Eye*, it would appear, however, that English surgeons at any rate had abandoned surgical methods in trachoma some little time before the period just mentioned. In the third edition of the book, published in 1844, Lawrence wrote, "Excision of the granulations, either with knife or scissors, was practised at one time ; and a dispute arose which method deserved the preference. This was terminated by the entire abandonment of the proceeding, which had been found injurious."

Among the few still advocating surgical methods was Dr. Pilz, who in 1854 advised that the granules should be excised from the conjunctiva. (9) His method was to remove one or two of the granules every day until the disease was subdued. It may be



noted in passing that Pilz also advocated the extrusion of the gelatinous contents of the infiltrated conjunctiva by pressure. These proposals, reasonable enough in themselves, do not appear to have been generally adopted. In the same year William Mackenzie (10) recommended that the hypertrophied papillæ of chronic trachoma should be removed with knife or scissors. "In performing the operation (he remarks) it is necessary to beware of removing more than the mere granular layer. If more than this be taken away hard and irregular cicatrices are left on the internal surface of the lids, the effects of which on the cornea may be scarcely, if at all, less prejudicial than those of the morbid structure which has been removed."

Five years later we meet with a suggestion of a somewhat different character. We find Borelli, (11) an Italian surgeon, proposing to remove the morbid material from the conjunctiva by means of a wire brush, the so-called "*scardasso*." It is of some interest to note that as lately as 1889 v. Schroder has reintroduced a method similar to that advocated by Borelli in 1859.

In 1867 De Wecker (12) recommended the excision of pedunculated granulations in very exceptional cases, and he laid great stress on removal of nothing beyond diseased tissue. A year later Stellwag von Carion (13) spoke in very similar terms. It may be pointed out that neither author was particularly enthusiastic in his recommendations.

Except for a few isolated instances of this kind, the surgical treatment of trachoma lay under a cloud during the four decades immediately preceding the year 1880.

Of late years, however, the pendulum has swung back, ancient methods have been revived, and many complicated surgical procedures for the relief of trachoma have been advocated.

Excision of the retrotarsal folds has been recommended by Richet and Galezowski (1874), Giffò (1879), Brachet (1882), Parizotti (1883), Voukchévitch (1884), R. Richter (1885), Jacobson (1888), Elschmig (1889), Treitel (1889), Pfalz, Veszely, Anfuso (1891), and many other surgeons.

Heisrath, (14) of Königsberg, dissatisfied with excision of the retrotarsal folds in cases of severe trachoma, went to the length of removing portions of the tarsus itself. He did not scruple to excise pieces of the tarsus and adjacent fornix measuring 1 cm. in height and 1.5 cm. in width. Heisrath performed the operation on 230 patients, and claimed most excellent results.

Scarification of the conjunctiva, combined in various ways with "*brossage*" or "*grattage*," has been recommended and practised among others by Abadie (1891), Dairier (1891 and 1892), Giotti, and Panas (1892).

Treatment by galvano-cautery has been brought prominently forward by Unterharnscheidt (1883), Dehenne (1884), and Fieuzal (1887).

Kasaurow in 1883, Cecchini in 1885, and Peunow in 1888, advocated scraping away the diseased tissue by means of a sharp spoon; while a similar treatment has lately been recommended by N. C. Macnamara (15) in England.

Mandelstamm (1883), Hotz (1886), Karwetzky, Wad-sinski, Noyes, Sattler (1891), and Jaesche (1892), advocated "expression" of the morbid material from the conjunctiva by means of the fingers or by the aid of special forceps.

Two further procedures attract attention more perhaps by reason of their complicated character than by their practical utility. I refer to the operations introduced by Noiszezewski and by Lindsay Johnston respectively.

Noiszezewski, (16) of Dunaburg, treats intractable cases of trachoma by excising a piece of the diseased conjunctiva from the upper lid, and into the wound thus produced he transplants mucous membrane taken from the patient's lip. The transplanted membrane, which is of rectangular shape, 5 mm. long and 8—11 mm. broad, is retained in place by four sutures. Noiszezewski has performed this operation on eight patients, but the results do not appear to me to have been strikingly successful. It is difficult to understand the *rationale* of an operation which leaves untouched the superior cul-de-sac—a structure regarded by the

best authorities as the principal focus of trachoma. There seems little likelihood, therefore, that Noisewski's operation will commend itself to the judgment of practical surgeons.

The second proposal to which I have alluded comes from an English surgeon, Dr. G. L. Johnson. (17) That gentleman treats trachoma by scarifying the conjunctiva of the lids and fornices with a specially designed scalpel armed with three parallel blades, which he terms a "*sillonneur*." Along the grooves made by this instrument he passes the terminals of an "*electrolyser*" in connection with a Stohrer's carbon and zinc battery, of which Dr. Johnson generally uses four or six cells. The operation thus combines scarification with electrolytic action. Johnson has carried out the method on ninety-eight eyes, and he reports good results. With regard to the operation, one may remark that its *technique* is complicated; that special instruments are needed; and that the efficient management of the electrical apparatus appears to be far from easy. I incline to the opinion, therefore, that however admirable the plan may be for the treatment of isolated cases, most surgeons will seek for simpler methods of attacking the disease.

At the present moment we witness the curious sight of two contending schools, of which one is opposed to almost all operative measures, while the other urges that surgical means alone should be employed in the treatment of trachoma. Fuchs, (18) on the one hand, would operate only in those rare cases where the morbid process is strictly limited to particular portions of the conjunctiva. On the other hand, Jacobson, (19) derides all methods of treatment by local applications, and claims that a radical cure can be attained by surgical interference only.

Such differences of opinion among distinguished observers show that the relative value of surgical and escharotic treatment is still open to question. My own experience leads me to the following conclusions. Trachoma beyond a doubt can be cured by local applications to the conjunctiva. The success of this plan can be attained, however, only after a patient course of

treatment extending over many months, or even years. The tedious course thus entailed may be abridged, often with brilliance and certainty, by the timely use of surgical measures. Were I asked to sum up the results of my personal experience in a few words, I should say that when used with judgment operative measures are simply invaluable in trachoma. At the same time, it cannot be too strongly urged that surgical proceedings must not be used to the exclusion of those therapeutic measures without which full justice can be done to no case.

Although I have tried many surgical methods in trachoma, I shall limit my remarks on the present occasion to a discussion of two operative procedures, namely, "expression," and excision of the conjunctival cul-de-sac. I observe this limitation, first, because I have had more extended experience of those than of some other operations; and, secondly, because I have found the operations to be described no less simple in their performance than satisfactory in their results.

### EXPRESSION.

Expression of the diseased material from the conjunctiva, according to Dr. Swanzy's statement, (20) was practised years ago by the late Sir William Wilde. This proceeding was, as we have already seen, recommended by Pilz in 1854, and reintroduced by Mandelstamm, (21) who wrote in 1883. But the operation did not attract general attention until the year 1886, when Hotz (22) published an enthusiastic paper, in which he claimed to have employed the procedure for five years. The last-mentioned surgeon had an exceedingly nervous patient suffering from "follicular trachoma and acute pannus," who, when his lids were everted for purposes of examination, contracted the orbicular muscle so forcibly that the contents of the trachomatous follicles were extruded. Next day he noted a remarkable improvement in the condition of the patient, and "in a few weeks he was discharged as cured." Taking his cue from this extraordinary incident, Hotz devised a formal operation for pressing out

the follicles. He employed the thumb or forefinger in the upper lids, while he used a pair of modified iris forceps for the lower lids.

Hotz's article at once raised "expression" to the position and dignity of a formal operation. Since the appearance of his paper many surgeons, especially in America, have worked on a similar principle, and a considerable amount of literature has been published on the subject.

The exact method employed to express the follicles varies, as might be expected, in the practice of different surgeons. Thus, Karwetsky uses fingers and forceps, as recommended by Hotz. Noyes (who has abandoned all other operative measures in favour of expression) uses two pairs of forceps, the ends of which are placed at right angles to the blades and are grooved. Prince employs ring-forceps, the extremities of which are rounded so as to avoid laceration of the conjunctiva. Jaesche, (23) of Dorpat, uses Himly's fenestrated forceps. H. Knapp, however, has introduced one of the most noteworthy improvements in the shape of a pair of roller-forceps, which he thus describes:—"The instrument is made according to the principle of the mangle. The branches of ordinary rather strong forceps divide at their ends like a horse-shoe, the free space of which is closed by a creased steel cylinder which rolls on pivots in sockets. The ends of the forceps thus resemble a stirrup.....The rolling cylinder (the foot-plate of the stirrup) is 20 to 25 mm. long and 1 to 1.5 mm. thick. It is made of steel, and can be taken apart to be cleaned."

In my own operations, I employ two kinds of forceps—1st. Ordinary stout dissecting forceps, and 2nd. stirrup forceps modified from Knapp's pattern. Thus, the rollers in my instrument are 9 or 10 mm. in length, and their surfaces are free from creases. Again, experience has convinced me that the comparatively small diameter (1 to 1.5 mm.) recommended by Knapp is insufficient to allow the rolling action of the instrument to come into play when dealing with swollen tissues. In my own instrument, therefore, the diameter of each cylinder is at least 3 mm.



Expression, which I have performed frequently, is indicated in the following conditions.

1. Follicular disease in which discrete follicles are scattered over the surface of an otherwise normal conjunctiva. Here it is a simple matter to seize and crush each individual follicle with dissecting forceps, and beyond this nothing more need be done in the majority of cases.

2. In trachoma of recent origin, expression often yields excellent results. As a first step it is necessary to squeeze out the contents of any grains which project markedly above the level of the conjunctiva, and then to subject the retro-tarsal folds and the entire extent of the conjunctiva to the squeezing process. The instrument I prefer for this latter purpose is the stirrup forceps, and a word in regard to the way in which it is used may not be out of place. In the first method, which applies to either lid, one roller is placed on the cutaneous and the other on the conjunctival surface. The blades are then closed, and the forceps firmly drawn towards the free margin of the lid, by which means the roller action is brought into play, and the morbid material squeezed out from the conjunctiva. In the second method, which applies to the upper lid only, the latter is everted, one roller pushed deeply into the cul-de-sac, while the other is placed over the tarsal conjunctiva as near the free border of the lid as possible. The blades are then closed, and the instrument drawn towards the free edge of the folded conjunctiva, so that each roller is in contact with mucous membrane only throughout the whole of these manipulations. In the third method, a swollen and granular fornix may be exposed, and submitted bodily to the action of the forceps. The material thus expressed is often forcibly thrown to a considerable distance, and may fall into the operator's eye—an accident not unlikely to be followed by serious consequences. In order to meet this contingency, it might be well for the surgeon to wear a pair of protective goggles.

In all these manipulations, the conjunctiva passes through the forceps much in the same way as linen is passed through a mangle, with the result that the



diseased material is extruded without damage to the actual conjunctival tissue. Knapp has pointed out that it is well to make traction on the forceps in as straight a line as possible, so as to preserve an equable pressure on all points of the rollers.

Since it is now known that the tarsus itself participates in the morbid processes of trachoma, it becomes of importance to subject that structure to considerable pressure during the performance of the operation. Further, the caruncle and the extremities of the superior fornix—which may be regarded as especial fastnesses of infectious material—should receive particular attention. In these positions the dissecting forceps may often be used with advantage.

3. In old and obstinate cases of trachoma, expression at times affords results of an unexpected nature. The details of operation differ, however, in no respect from those already described.

The painful character of expression leads many surgeons to employ a general anæsthetic, but personally I have never used anything but cocaine. All the lids may, if necessary, be operated upon at one and the same sitting.

It is noteworthy that the conjunctiva is extremely tolerant of the apparently rough treatment involved in the operation of expression. The softer material of the granulations breaks down long before the pressure used is sufficient to damage the conjunctiva itself, and the surgeon can at once judge when enough has been done not only by the appearance of the parts, but also by the feeling of the tissue underneath the forceps.

After the operation it is well to encourage bleeding by the assiduous application of hot water to the closed eyelids. No dressing is needed; the eyes are simply rinsed out occasionally with a simple antiseptic lotion.

Ecchymosis of globe or of lids, redness of the conjunctiva, and some slight swelling of the eyelids, may each or all follow the operation, although as a general rule there is remarkably little reaction. At the same time it is by no means rare for a grayish membrane to make its appearance on the palpebral conjunctiva a

day or two after the operation. This seldom lasts for more than a short time, and portends no serious result. As a matter of fact, such membranes commonly follow any operative interference with the conjunctiva. One further point should be noted. Adhesions are liable to form between adjacent folds of conjunctiva, more especially in the lower lid, and such adhesions should be searched for systematically, and broken down with a probe.

To complete the cure of trachoma in any given case, expression may have to be repeated several times.

#### EXCISION OF THE CUL-DE-SAC.

As we have already seen, the practice of cutting out pieces of diseased conjunctiva has been advocated at various times since the days of Hippocrates. Galezowski (24) appears, however, to have been the first to recommend excision of the cul-de-sac as a definite method of treatment. From his paper, published in 1874, we learn that he had practised the method for some years, and that he had obtained excellent results in a series of more than 200 cases. Galezowski everted the eyelid, and dissected away the fornix, which he had previously seized with a pair of double fixation forceps (*Pince à granulation*). The operation was applied more generally to the upper cul-de-sac, but at times Galezowski removed both upper and lower culs-de-sac at one sitting. It may be mentioned as a point of some practical interest that Galezowski in almost all cases resumed local treatment three days after the operation.

Despite repeated communications from Galezowski in favour of his operation, excision of the cul-de-sac does not appear to have attained much popularity among ophthalmic surgeons until the year 1882, when Brachet (25) published an account of a patient from whom both culs-de-sac had been removed eight years previously. The condition of that patient was most satisfactory. The pannus had cleared up; the conjunctiva was scarred and smooth; the position of the eyelids was normal; and the movements of the globe were not in the least hampered.

Brachet's communication attracted considerable

attention, and numerous contributions to the literature of the subject soon made their appearance. Among the more notable of these were certain communications by Vouckchévitch (26) and by Schneller (27). The former, while fully confirming the statements already made by Galezowski and by Brachet, published the clinical histories of a number of cases in which excision of the cul-de-sac had been successful in curing trachoma. Schneller was originally in the habit of removing the diseased folds with a knife, but an accident of a serious nature caused him to modify this method, and led him to substitute fenestrated forceps and blunt-pointed scissors for the scalpel. Schneller practised the operation extensively, and spoke of its value in the highest terms.

One could hardly expect that so radical a method would remain free from adverse criticism, and as a matter of fact we find that the opponents of the operation lost no time in raising all kinds of objections to the proceeding. Hotz, (28) for instance, asserted that removal of the folds must seriously impair the mobility of the eyelids and said, in so many words, that the cure was worse than the disease; while Jæschke (29) expressed himself in a similar although in a more scientific way. Lloret condemned the operation and believed that it was likely to produce entropion. In short, a fear has been expressed in many quarters that excision of the retro-tarsal folds would give rise to ptosis or other malposition of the eyelids on account of the excessive scar-changes alleged to follow the operation. Sattler, (30) on the other hand, urged that the numerous objections to the operation were without foundation, and his expression of opinion is the more valuable from the fact that he has since abandoned excision of the cul-de-sac in favour of scraping with a sharp spoon.

For my part, I have now performed excision of the upper cul-de-sac on thirty-seven eyes, and many of my patients have been under observation for upwards of three years. Once only have I seen any untoward result follow the operation. In that case unequal contraction took place in the scar, and for a time the inner surface of the upper lid showed a groove running

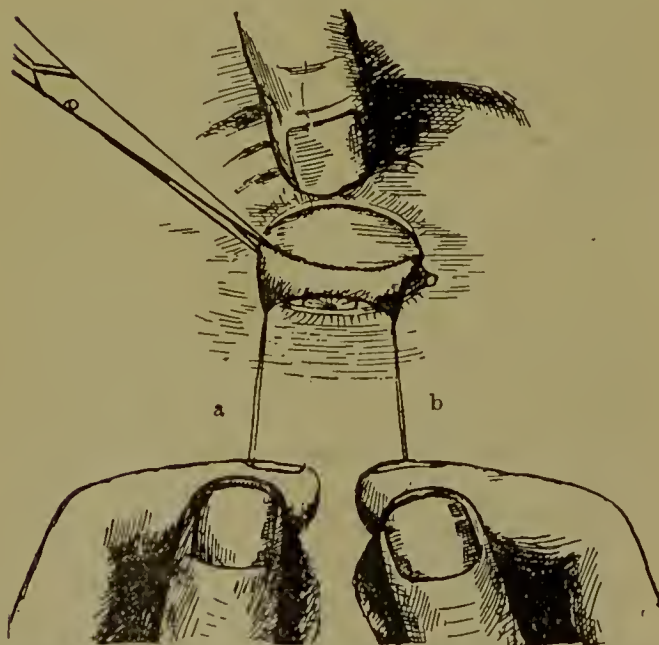
down its centre. Seven weeks after the first operation the cicatrix was dissected up, and a strip of rabbit's conjunctiva placed between its cut surfaces. This simple expedient succeeded in permanently removing the distortion of the lid.

As a point of some interest it may be mentioned that I have several times seen the ptosis of severe trachoma actually benefited by removal of the superior cul-de-sac. It would seem as if removal of the swollen and loose conjunctiva enabled the levator muscle to act to better advantage, and in this way to counteract the drooping of the lid.

Many reasons have led me to remove the upper in preference to the lower cul-de-sac. Owing probably to the fact that the superior fornix contains a relatively large amount of adenoid tissue, it is usual to find the trachomatous processes more advanced there than elsewhere. Further, the inaccessible position of the retro-tarsal fold renders it a matter of the greatest difficulty to apply local remedies efficiently to its surface. From these reasons it often comes about that even after a tedious course of local treatment, the upper fold contains an abundance of granular conjunctiva, while the other parts of the lids are for all practical purposes restored to a healthy condition. Further, it is a fact, sufficiently familiar to ophthalmic surgeons, that relapses of trachoma take their origin in the majority of cases from the tissues of the upper cul-de-sac, a tendency which is doubtless related to the above mentioned difficulty of applying local treatment to its surface. Again, the condition of the cornea is closely dependent on that of the upper retro-tarsal fold. Pannus, for example, almost always occurs with a swollen, congested, and thickened fold, and I may say, indeed, that in my experience corneal changes are rarely met with when the condition of the upper cul-de-sac is really satisfactory. Lastly, I may add my conviction that an excision limited to the upper cul-de-sac is capable of favourably influencing the disease in other parts of the conjunctiva, and that local remedies, useless before the operation, often act well after its performance.

At this point, a simple method of removing the upper cul-de-sac, which I have practised in all my cases, may be briefly described.

FIG. 1



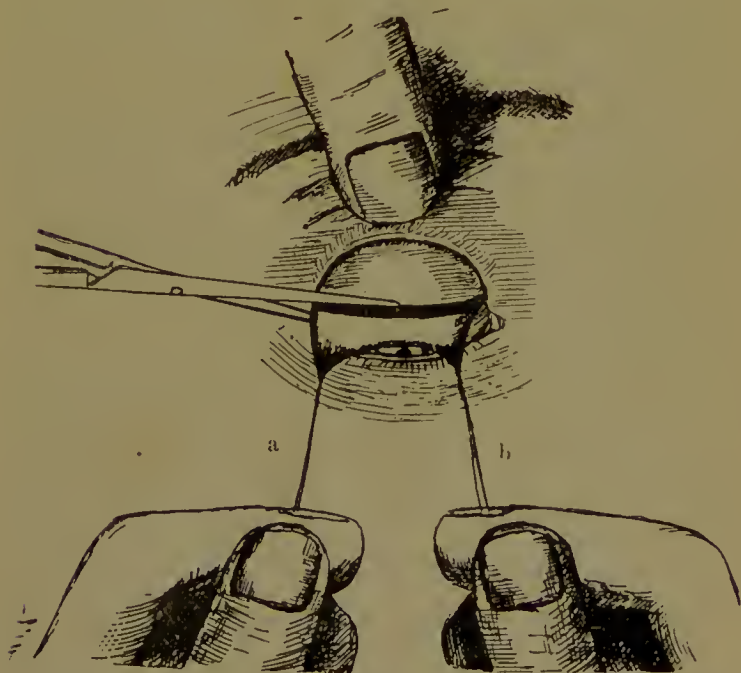
(The threads (a and b) should be drawn as held between finger and thumb.)

The upper lid is everted, and the cul-de-sac brought well into view. Through the extremities of the fold, two moderately strong silk sutures are passed, the free ends of which are given to an assistant, with instructions to keep the cul-de-sac everted, and "on the stretch" during the subsequent proceedings. An incision is then made with blunt-pointed scissors, along the line of attachment of the fornix to the tarsal conjunctiva; this incision should, however include nothing beyond the anterior layer of the cul-de-sac. (Fig. 1.) As



soon as that layer is freed from its attachments, a dissection is made into the sub-conjunctival tissue, and carried as far backwards as the surgeon deems necessary. During this stage the insertion of the levator muscle will lie well away from the cul-de-sac, and there will be little chance of damaging it, provided due care be exercised. The dissection will be materially assisted by an intelligent manipulation of the sutures attached to the fornix.

FIG. II



(See remark to Fig. 1).

Finally, the operation is completed by cutting transversely through the posterior layer of the cul-de-sac, which thus comes away bodily, together with its attached sutures. (Fig. 2.)

During the excision of the cul-de-sac, bleeding is



often free, and it may be sometimes necessary to twist one or two small spouting vessels. In my own practice, I never employ any sutures to close the wound.

When the palpebral apertures are preternaturally small, I have no hesitation in dividing the tissues at the outer angle of the eye before excising the cul-de-sac. Since a permanent enlargement of the palpebral fissure is desirable under these circumstances for many reasons, it is well to secure the patency of the opening by three sutures applied in a manner too well known to call for separate description (*canthoplasty*). It should be noted that a very similar plan was recommended by Richet in 1874, (31) and that many surgeons have since adopted the suggestion.

Antiseptic precautions should be used both before and after excision of the cul-de-sac. The dressings may well consist of a piece of old linen thickly smeared with iodoform ointment, and covered with alenbroth wool. I attach considerable importance to a policy of non-interference in the after-treatment of the case; thus I do not inspect the wound for five or six days after the operation unless there are special reasons to the contrary.

After removal of the cul-de-sac, certain appearances are commonly met with. For example, ecchymosis of the lids, hæmorrhages in the conjunctiva, and a greyish film over the seat of operation are constantly observed, while more rarely the lids become markedly swollen, or chemosis is seen. In none of my cases was there any rise in temperature. The average length of time between operation and complete healing of the wound was nine days.

Two complications call for especial notice, namely, ptosis and the growth of wound granulations. With regard to the first, it is necessary to distinguish carefully between temporary and permanent ptosis resulting from excision of the upper cul-de-sac. The temporary form, commonly present, is due, no doubt, to general swelling of the parts. It possesses no particular significance, and disappears in process of time. On the other hand, permanent ptosis follows excision of

the fornix only when that operation has involved interference with the tarsal insertion of the levator palpebræ muscle. As already pointed out, the chance of such an unfortunate occurrence will be reduced to a vanishing point if the operation be performed according to the method above described. The second complication, the growth of wound granulations, is by no means uncommon after removal of the upper retro-tarsal fold. It was observed, for instance, in ten of my cases. The growths, which may attain a large size, often bear a close resemblance to a cock's comb. With regard to these wound granulations, it may be pointed out that it is quite useless to apply caustic to them; they should be snipped away with curved scissors. In one of my cases, even after that had been done, renewed growth took place on four occasions.

What cases are likely to receive benefit from removal of the upper cul-de-sac? The first and foremost place must be assigned to those examples of chronic trachoma in which the ordinary treatment by escharotics has proved unavailing. No matter what particular agent be used in such cases, no matter how that agent be applied, the condition of the conjunctiva gets steadily worse: such cases are, in truth, the mere despair of surgery. The second class of case in which the operation is indicated are those in which the upper fornix is occupied by a mass of voluminous and reddened conjunctiva, often folded in an extraordinary way. Here excision will often render invaluable aid to the surgeon in his efforts to quell the disease.

Attention may now be drawn to some of the advantages possessed by the method of removing the cul-de-sac which I have described above. The operation is easy of performance. So far from any special instruments being needed, a pair of scissors, a needle, and some silk complete the surgical outfit. A further advantage lies in the fact that this method permits one to remove just as much or as little conjunctiva as the nature of the case requires. Ordinarily, one takes away an oblong piece of the cul-de-sac, measuring, say, 28 by 9 mm. There are cases, however, in which a smaller or larger excision may be performed with advantage. In this connection, it should be borne in

mind that the size of the piece of conjunctiva removed is, as a matter of fact, much less than would at first sight seem probable. The trachomatous cul-de-sac is, of course, larger than the healthy one. It is therefore likely, as pointed out by Walther and other authors, that the piece removed from a diseased fornix is at least twice as large as would be the case under ordinary circumstances. Lastly, if the fold be removed according to the principles I have laid down, the tendon of the levator palpebræ superioris runs little, if any, risk of damage: in other words, the operation is not likely to be followed by permanent ptosis, a point of obvious practical importance.

The advocates of excision claim excellent results from the operation. They affirm that the treatment of trachoma is abridged; that corneal complications speedily clear up; and that the operation affords a great, if not an absolute, protection against the occurrence of relapses. They hold, moreover, that the disease in other portions of the conjunctiva quickly recedes after removal of the upper retro-tarsal fold. Their statements tally with my own experience, and I am of opinion that in excision of the upper transition fold we have an operation easy of performance, free from danger, and satisfactory in its results.

In bringing this paper to a close, I should wish to state clearly that I am in no sense an advocate for surgical intervention in ordinary cases of trachoma. Every-day treatment suffices for the common run of cases. Surgical measures, it cannot be too often repeated, are called for exceptionally only, and even then they require to be supplemented by the use of local remedies. In trachoma, as in affairs generally, it is well to observe the golden mean, a wholesome rule, the infraction of which is likely to be fraught with evil consequences both to surgeon and to patient.

The conclusions I have reached with regard to the surgical treatment of trachoma are as follows:—

1. Surgical methods have been practised in trachoma since the days of Hippocrates.

2. In properly selected cases surgical treatment should be employed, but only as a means to an end, and not to the exclusion of other therapeutic measures.

3. "Expression" is an operation of considerable value, and as such deserves a permanent place in the treatment of trachoma.

4. Excision of the upper cul-de-sac, performed on the principles laid down in this paper, is free from immediate and remote danger. The operation is worthy of trial in cases of trachoma which resist the ordinary methods of treatment.

5. Local remedies are necessary in almost every case of trachoma in order to complete that cure which surgical methods have brought within the compass of a reasonable length of time.

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